Attachment 10

San Diego Integrated Regional Water Management
Implementation Grant Proposal
Cost and Benefits Summary

Attachment 10 consists of the following items:

- ✓ **Cost and Benefits Summary.** This attachment contains a summary of the costs and benefits associated with each project listed within this Implementation Grant Proposal.

This attachment contains an overall estimate of the costs and benefits of each project listed within this *San Diego IRWM Implementation Grant Proposal* by providing a summary of the cost benefit information from Attachments 7, 8, and 9. Because several projects are being proposed with multiple benefits, this attachment summarizes the costs and benefits for all projects in this grant application.

Costs and Benefits Summary

Project 1: Sustainable Landscapes Program

The benefits that are anticipated to result from implementation of the *Sustainable Landscapes Program* are summarized below in Table 10-1, and the cost-benefit overview is summarized in Table 10-2.

Table 10-1: Benefits Summary
Sustainable Landscapes Program

Type of Benefit	Assessment Level	Beneficiaries
Water Supply Benefits		
Avoided Water Imports	Monetized	Local, regional, and statewide
Water Supply Reliability	Qualitative	Local, regional, and statewide
Water Quality and Other Benefits		
Avoided Wastewater Treatment	Monetized	Local and regional
Reduced Ocean Pollution Discharge	Qualitative	Local and regional
Power Cost Savings	Monetized	Local, regional, and statewide
Reduction in Runoff	Physical Quantification	Local and regional
Green Waste Reduction	Physical Quantification	Local, regional, and statewide
CO_2 Emissions Reduction	Physical Quantification	Local, regional, and statewide
Flood Damage Reduction Benefits		
Not applicable	*Not Applicable*	*Not Applicable*

Table 10-2: Benefit-Cost Analysis Overview
Sustainable Landscapes Program

	Present Value ($2009)
Costs – Total Capital and O&M	**$1,157,709**
Monetizable Benefits	
Avoided Water Imports	$140,576
Avoided Wastewater Treatment	$2,019,207
Power Cost Savings	$379,568
Total Benefits	**$2,539,351**
Qualitative Benefits	**Qualitative Indicator***
Water Supply Reliability	+
Reduced Ocean Pollution Discharge	+
Green Waste Reduction	+
Reduction in Runoff	+
CO_2 Emissions Reduction	+

* Magnitude of effect on net benefits
+/- (negligible or unknown); + (moderate positive); ++ (significant positive); - (moderate negative); -- (significant negative)

Project 2: North San Diego County Regional Recycled Water Project

The benefits that are anticipated to result from implementation of the *North San Diego County Regional Recycled Water Project* are summarized below in Table 10-3, and the cost-benefit overview is summarized in Table 10-4.

Table 10-3: Benefits Summary
North San Diego County Regional Recycled Water Project

Type of Benefit	Assessment Level	Beneficiaries
Water Supply Benefits		
Avoided Water Imports	Monetized	Local / Regional
Increased Water Sales Revenue	Qualitative	Local / Regional
Water Supply Reliability (Avoided Water Shortage Costs)	Qualitative	Local / Regional / Statewide
Water Quality and Other Benefits		
Reduction in Wastewater Discharges	Physical Quantification	Regional
Habitat Protection	Qualitative	Regional / Statewide
Flood Damage Reduction Benefits		
Not Applicable	*Not Applicable*	*Not Applicable*

Table 10-4: Benefit-Cost Analysis Overview
North San Diego County Regional Recycled Water Project

	Present Value ($2009)
Costs – Total Capital and O&M	$17,199,249
Monetizable Benefits	
Avoided Water Imports	$61,324,268
Total Benefits	**$61,324,268**
Qualitative Benefits	**Qualitative Indicator***
Water Supply Reliability	+
Reduction in Wastewater Discharges	+/-
Regional Habitat Protection	+/-
Bay–Delta Habitat Protection	+

*Magnitude of effect on net benefits

+/- (negligible or unknown); + (moderate positive); ++ (significant positive); - (moderate negative); -- (significant negative)

Project 3: North San Diego County Cooperative Demineralization Project

The *North San Diego County Cooperative Demineralization Project* would result in water supply benefits associated with avoided water supply purchases, increased water sales revenue, and avoided water shortage costs. These water supply benefits are summarized below in Table 10-5. The magnitude of benefits, which were monetized when possible, is summarized in Table 10-6.

Table 10-5: Benefits Summary
North San Diego County Cooperative Demineralization Project

Type of Benefit	Assessment Level	Beneficiaries
Water Supply Benefits		
Avoided Water Imports (Demineralization)	Monetized	Local / Regional
Avoided Water Imports (Desalination)	Physical Quantification	Local / Regional
Increased Water Sales Revenue	Qualitative	Local / Regional
Improved Water Supply Reliability (Avoided Water Shortage Costs)	Qualitative	Local / Regional / Statewide
Water Quality and Other Benefits		
Avoided Costs of Treatment Facility	Quantitative	Local / Regional
Reduction in Pollutants to San Elijo Lagoon	Qualitative	Local / Regional / Statewide
Reduction in Wastewater Discharges	Physical Quantification	Regional
Increased Operational Efficiency (SEWRF)	Qualitative	Regional
Habitat Protection (Regional and Bay-Delta)	Qualitative	Local / Regional / Statewide
Increase in Recreational Opportunities	Qualitative	Local / Regional / Statewide
Flood Damage Reduction Benefits		
Not Applicable	*Not Applicable*	*Not Applicable*

Table 10-6: Benefit-Cost Analysis Overview
North San Diego County Cooperative Demineralization Project

	Present Value ($2009)
Costs – Total Capital and O&M	$27,802,301
Monetizable Benefits	
Water Supply Benefits	$55,645,552
Total Benefits	**$55,645,552**
Qualitative Benefits	**Qualitative Indicator***
Improved Water Supply Reliability	+
Avoided Costs of Treatment Facility	+/-
Reduction in Pollutants to San Elijo Lagoon	+
Reduction in Wastewater Discharges	+/-
Increased Operational Efficiency (SEWRF)	+/-
Regional Habitat Protection	+/-
Bay–Delta Habitat Protection	+
Increase in Recreational Opportunities	+/-

*Magnitude of effect on net benefits
+/- (negligible or unknown); + (moderate positive); ++ (significant positive); - (moderate negative); -- (significant negative)

Project 4: Rural Disadvantaged Community (DAC) Partnership Project

The benefits that are anticipated to result from implementation of the *Rural Disadvantaged Community (DAC) Partnership Project* are summarized below in Table 10-7, and the cost-benefit overview is summarized in Table 10-8.

Table 10-7: Benefits Summary
Rural DAC Partnership Project

Type of Benefit	Assessment Level	Beneficiaries
Water Supply Benefits		
Avoided Water Supply Purchases	Monetized	Local
Water Supply Reliability	Qualitative	Local, regional, and statewide
Water Quality and Other Benefits		
Improvements to Drinking Water Beneficial Use	Qualitative	Local
Improvements to Wastewater Beneficial Use	Physical Quantification	Local and regional
Avoided Public Health Impacts Related to Drinking Water	Physical Quantification	Local
Avoided Public Health Impacts Related to Wstewater	Physical Quantification	Local
Avoided Loss of Economy and Community	Qualitative	Local
Flood Damage Reduction Benefits		
Not Applicable	*Not Applicable*	*Not Applicable*

Table 10-8: Benefit-Cost Analysis Overview
Rural DAC Partnership Project

	Present Value ($2009)
Costs – Total Capital and O&M	**$707,463**
Monetizable Benefits	
Avoided Water Supply Purchases	$172,718
Total Benefits	**$172,718**
Qualitative Benefits	**Qualitative Indicator***
Water Supply Reliability	+
Improvements to Drinking Water Beneficial Use	+
Improvements to Wastewater Beneficial Use	+
Avoided Public Health Impacts	++
Avoided Loss of Economy and Community	+

* Magnitude of effect on net benefits

+/- (negligible or unknown); + (moderate positive); ++ (significant positive); - (moderate negative); -- (significant negative)

Project 5: Lake Hodges Water Quality and Quagga Mitigation Measures

The benefits that are anticipated to result from implementation of the *Lake Hodges Water Quality and Quagga Mitigation Measures* project are summarized below in Table 10-9, and the cost-benefit overview is summarized in Table 10-10.

Table 10-9: Benefits Summary
Lake Hodges Water Quality and Quagga Mitigation Measures

Type of Benefit	Assessment Level	Beneficiaries
Water Supply Benefits		
Increased Water Supply Usability	Monetized	Local, Regional, and Statewide
Improved Water Supply Reliability	Qualitative	Local and Regional
Water Quality and Other Benefits		
Avoided Repair Costs Due to Quagga Infestation	Monetized	Local and Regional
Fish and Wildlife Enhancements	Qualitative	Local and Regional
Avoided Losses in Power Production	Monetized	Local, Regional, and Statewide
Flood Damage Reduction Benefits (see Attachment 9)		
Not Applicable	*Not Applicable*	*Not Applicable*

Table 10-10: Benefit-Cost Analysis Overview
Lake Hodges Water Quality and Quagga Mitigation Measures

	Present Value ($2009)
Costs – Total Capital and O&M	**$1,517,868**
Monetizable Benefits	
Increased Water Supply Usability	$41,783,290
Avoided Repair Costs Due to Quagga Infestation	$3,284,626
Avoided Losses in Power Production	$8,829,075
Total Benefits	**$53,896,990**
Qualitative Benefits	**Qualitative Indicator***
Improved Water Supply Reliability	+
Fish and Wildlife Enhancements	+

*Magnitude of effect on net benefits
+/- (negligible or unknown); + (moderate positive); ++ (significant positive); - (moderate negative); -- (significant negative)

Project 6: Implementing Nutrient Management in the Santa Margarita River Watershed

The benefits that are anticipated to result from implementation of the *Implementing Nutrient Management in the Santa Margarita River Watershed* project are summarized below in Table 10-11, and the cost-benefit overview is summarized in Table 10-12.

Table 10-11: Benefits Summary
Implementing Nutrient Management in the Santa Margarita River Watershed

Type of Benefit	Assessment Level	Beneficiaries
Water Supply Benefits		
Avoided Water Imports	Monetized	Local
Water Quality and Other Benefits		
Avoided Costs of Regulatory Compliance	Physical Quantification	Local and Regional
Protection of Beneficial Uses	Qualitative	Local and Regional
Improve Impaired Water Bodies and Sensitive Habitats	Qualitative	Local and Regional
Increase In-Stream Flows	Qualitative	Local and Regional
Fish and Wildlife Enhancements	Qualitative	Local, Regional, and Statewide
Flood Damage Reduction Benefits		
Not Applicable	*Not Applicable*	*Not Applicable*

Table 10-12: Benefit-Cost Analysis Overview
Implementing Nutrient Management in the Santa Margarita River Watershed

	Present Value ($2009)
Costs – Total Capital and O&M	**$1,534,082**
Monetizable Benefits	
Avoided Water Imports	$40,866,899
Total Benefits	**$40,866,899**
Qualitative Benefits	**Qualitative Indicator***
Avoided Costs of Regulatory Compliance	++
Protection of Beneficial Uses	+
Improve Impaired Water Bodies and Sensitive Habitats	+
Increase In-Stream Flows	+
Fish and Wildlife Enhancements	+

* Magnitude of effect on net benefits
+/- (negligible or unknown); + (moderate positive); ++ (significant positive); - (moderate negative); -- (significant negative)

Project 7: Bannock Avenue Neighborhood Streetscape Enhancements for Tecolote Creek Watershed Protection

The benefits that are anticipated to result from implementation of the *Bannock Ave Neighborhood Streetscape Enhancements for Tecolote Creek Watershed Protection* project are summarized below in Table 10-13, and the cost-benefit overview is summarized in Table 10-14.

Table 10-13: Benefits Summary
Bannock Ave Neighborhood Streetscape Enhancements for Tecolote Creek Watershed Protection

Type of Benefit	**Assessment Level**	**Beneficiaries**
Water Supply Benefits		
Not Applicable	*Not Applicable*	*Not Applicable*
Water Quality and Other Benefits		
Avoided Costs of Treatment Facility	Monetized	Local and Regional
Reduction in TSS and TDS	Physical Quantification	Local and Regional
Increase in Recreational Opportunities	Qualitative	Local and Regional
Flood Damage Reduction Benefits		
Not Applicable	*Not Applicable*	*Not Applicable*

Table 10-14: Benefit-Cost Analysis Overview
Bannock Ave Neighborhood Streetscape Enhancements for Tecolote Creek Watershed Protection

	Present Value ($2009)
Costs – Total Capital and O&M	$4,168,512
Monetizable Benefits	
Avoided Costs of Treatment Facility	$1,072,816
Total Benefits	$1,072,816
Qualitative Benefits	**Qualitative Indicator***
Reduction in TSS and TDS	+
Increase in Recreational Opportunities	+

* Magnitude of effect on net benefits
+/- (negligible or unknown); + (moderate positive); ++ (significant positive); - (moderate negative); -- (significant negative)

Project 8: Pilot Concrete Channel Infiltration Project

The benefits that are anticipated to result from implementation of the *Pilot Concrete Channel Infiltration Project* are summarized below in Table 10-15, and the cost-benefit overview is summarized in Table 10-16.

Table 10-15: Benefits Summary
Pilot Concrete Channel Infiltration Project

Type of Benefit	Assessment Level	Beneficiaries
Water Supply Benefits		
Groundwater Recharge	Qualitative	Regional
Water Quality and Other Benefits		
Avoided Costs of UV Treatment Facility	Monetized	Local and Regional
Reduction in Nitrate Discharge	Physical Quantification	Local and Regional
Reduction in Bacteria Discharge	Physical Quantification	Local and Regional
Flood Damage Reduction Benefits		
Not Applicable	*Not Applicable*	*Not Applicable*

Table 10-16: Benefit-Cost Analysis Overview
Pilot Concrete Channel Infiltration Project

	Present Value ($2009)
Costs – Total Capital and O&M	$281,294
Monetizable Benefits	
Avoided Costs of UV Treatment Facility	$1,809,240
Total Benefits	**$ 1,809,240**
Qualitative Benefits	**Qualitative Indicator***
Groundwater Recharge	+/-
Reduction in Nitrate Discharge	+
Reduction in Bacteria Discharge	+

*Magnitude of effect on net benefits
+/- (negligible or unknown); + (moderate positive); ++ (significant positive); - (moderate negative); -- (significant negative)

Project 9: San Diego Regional Water Quality Assessment and Outreach Project

The *San Diego Regional Water Quality Assessment and Outreach Project* would not result in water supply benefits. The overall benefits of the project are summarized below in Table 10-17. The magnitude of benefits, which were monetized when possible, is summarized in Table 10-18.

Table 10-17: Benefits Summary
San Diego Regional Water Quality Assessment and Outreach Project

Type of Benefit	Assessment Level	Beneficiaries
Water Supply Benefits		
Not Applicable	*Not Applicable*	*Not Applicable*
Water Quality and Other Benefits		
Protect, Restore, or Enhance Beneficial Uses	Physical Quantification	Local and Regional
Improve Impaired Water Bodies and Sensitive Habitats	Physical Quantification	Local and Regional
Ecosystem Improvements and Preservation Through Trash Collection	Monetized	Local and Regional
Avoided Regulatory Monitoring	Monetized	Local and Regional
Flood Damage Reduction Benefits		
Not Applicable	*Not Applicable*	*Not Applicable*

Table 10-18: Benefit-Cost Analysis Overview
San Diego Regional Water Quality Assessment and Outreach Project

	Present Value ($2009)
Costs – Total Capital and O&M	**$924,578**
Monetizable Benefits	
Avoided Regulatory Monitoring	$667,315
Avoided Trash Collection	$30,831
Total Benefits	**$698,146**
Qualitative Benefits	**Qualitative Indicator***
Protect, Restore, or Enhance Beneficial Uses	+
Improve Impaired Water Bodies and Sensitive Habitats	+

*Magnitude of effect on net benefits
+/- (negligible or unknown); + (moderate positive); ++ (significant positive); - (moderate negative); -- (significant negative)

Project 10: Chollas Creek Integration Project

The *Chollas Creek Integration Project* would not result in water supply benefits, but would result in water quality, flood damage reduction and other benefits. These benefits are summarized below in Table 10-19. The magnitude of benefits, which were monetized when possible, is summarized in Table 10-20.

Table 10-19: Benefits Summary
Chollas Creek Integration Project

Type of Benefit	Assessment Level	Beneficiaries
Water Supply Benefits		
Not Applicable	*Not Applicable*	*Not Applicable*
Water Quality and Other Benefits		
Reduction in Pollutants	Physical Quantification	Local and Regional
Increase in Recreation Opportunities	Qualitative	Local
Habitat Restoration	Physical Quantification	Local
Ecosystem Improvements	Qualitative	Local and Regional
Fish and Wildlife Species Enhancements	Physical Quantification	Local, Regional, and Statewide
Flood Damage Reduction Benefits		
Avoided Flood Damages	Monetized	Local

Table 10-20: Benefit-Cost Analysis Overview
Chollas Creek Integration Project

	Present Value ($2009)
Costs – Total Capital and O&M	$1,018,096
Monetizable Benefits	
Avoided Flood Damages	$301,165
Total Benefits	**$301,165**
Qualitative Benefits	**Qualitative Indicator***
Reduction in Pollutants	+
Increase in Recreation Opportunities	+
Habitat Restoration	+
Ecosystem Improvements	+
Fish and Wildlife Species Enhancements	+

*Magnitude of effect on net benefits
+/- (negligible or unknown); + (moderate positive); ++ (significant positive); - (moderate negative); -- (significant negative)

Project 11: Regional Water Data Management Program

The *Regional Water Data Management Program* would not result in water supply benefits. The overall benefits of the project are summarized below in Table 10-21. The magnitude of benefits, which were not monetized, is summarized in Table 10-22.

Table 10-21: Benefits Summary
Regional Water Data Management Program

Type of Benefit	Assessment Level	Beneficiaries
Water Supply Benefits		
Not Applicable	*Not Applicable*	*Not Applicable*
Water Quality (see Attachment 8)		
Avoided Regulatory Monitoring	Qualitative	Local, Regional, and Statewide
Increased Water Management Efficiencies	Qualitative	Local, Regional, and Statewide
Flood Damage Reduction Benefits (see Attachment 9)		
Not Applicable	*Not Applicable*	*Not Applicable*

Table 10-22: Benefit-Cost Analysis Overview
Regional Water Data Management Program

	Present Value ($2009)
Costs – Total Capital and O&M	**$540,043**
Monetizable Benefits	
Not applicable	N/A
Total Benefits	**N/A**
Qualitative Benefits	**Qualitative Indicator***
Avoided Regulatory Monitoring	+
Increased Water Management Efficiencies	+

* Magnitude of effect on net benefits
+/- (negligible or unknown); + (moderate positive); ++ (significant positive); - (moderate negative); -- (significant negative)

Proposal Summary

Table 10-23 provides an overview of the costs and benefits of the entire *San Diego IRWM Implementation Grant Proposal*. The overall benefit-cost ratio for the proposal is 3.4.

Table 10-23: Costs and Benefits Summary
San Diego IRWM Implementation Grant Proposal

#	Project	Project Sponsor	Total Present Value Project Costs	Total Present Value Project Benefits				Benefit/ Cost Ratio
				Water Supply	Water Quality & Other	Flood Damage Reduction	Total	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
1	Sustainable Landscapes Program	San Diego County Water Authority	$1,157,709	$140,576	$2,398,775	$0	$2,539,351	2.2
2	North San Diego County Regional Recycled Water Project	Olivenhain Municipal Water District	$17,199,249	$61,324,268	$0	$0	$61,324,268	3.6
3	North San Diego County Cooperative Demineralization Project	San Elijo Joint Powers Authority	$27,802,301	$55,645,552	$0	$0	$55,645,552	2.0
4	Rural Disadvantaged Community (DAC) Partnership Project	Rural Community Assistance Corporation	$707,463	$172,718	$0	$0	$172,718	0.2
5	Lake Hodges Water Quality and Quagga Mitigation Measures	San Diego County Water Authority	$1,517,868	$41,783,290	$12,113,701	$0	$53,896,990	35.5
6	Implementing Nutrient Management in the Santa Margarita River Watershed	County of San Diego	$1,534,082	$40,866,899	$0	$0	$40,866,899	26.6
7	Bannock Avenue Neighborhood Streetscape Enhancements for Tecolote Creek Watershed Protection	City of San Diego - Storm Water Department	$4,168,512	$0	$1,072,816	$0	$1,817,637	0.4
8	Pilot Concrete Channel Infiltration Project	City of Santee	$281,294	$0	$1,809,240	$0	$1,809,240	6.4
9	San Diego Regional Water Quality Assessment and Outreach Project	San Diego Coastkeeper	$924,578	$0	$698,146	$0	$698,146	0.8
10	Chollas Creek Integration Project	Jacobs Center for Neighborhood Innovation	$1,018,096	$0	$0	$301,165	$301,165	0.3
11	Regional Water Data Management	County of San Diego	$540,043	$0	$0	$0	$0	-
		TOTAL	**$56,851,195**	**$199,933,303**	**$18,092,678**	**$301,165**	**$218,327,146**	**3.8**